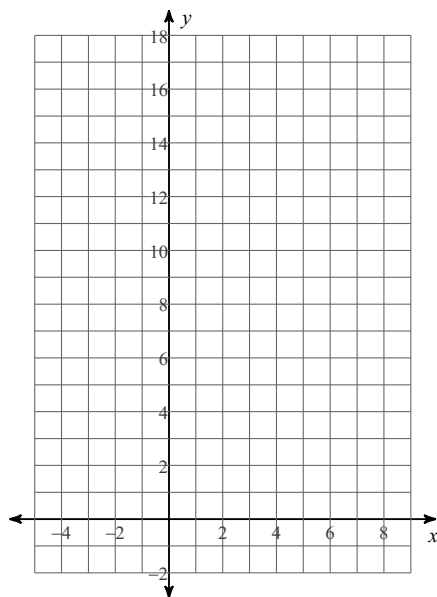


Ch 3 Extra Practice

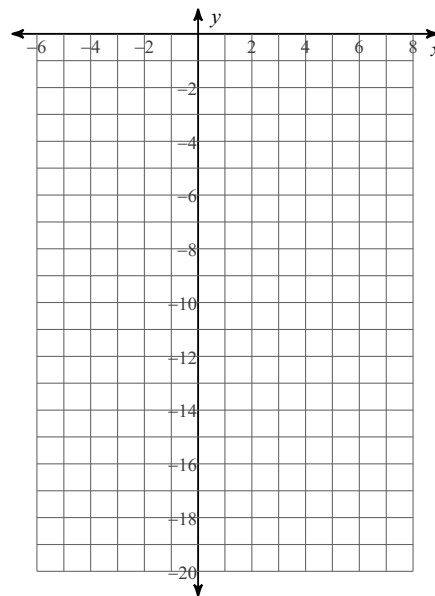
Date _____ Period _____

Sketch the graph of each function.

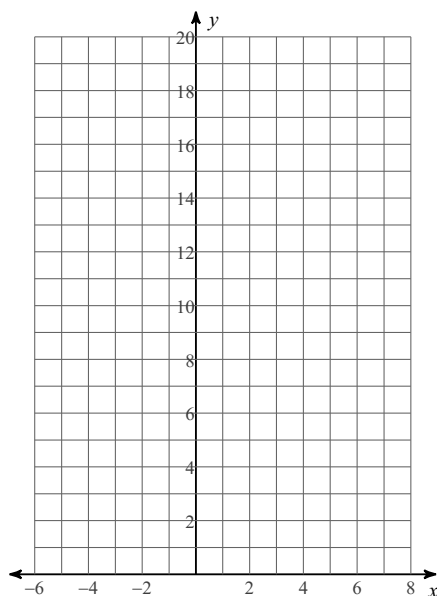
1) $f(x) = 2 \cdot 2^{x-2} - 2$



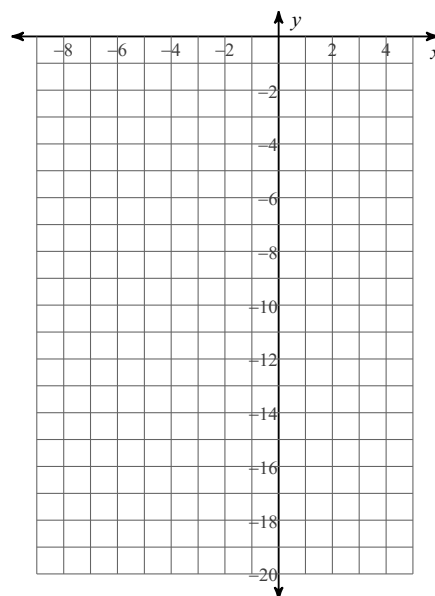
2) $f(x) = -\frac{1}{3} \cdot \left(\frac{1}{2}\right)^{x-1} - 2$



3) $f(x) = \frac{1}{3} \cdot \left(\frac{1}{e}\right)^{x-1} + 2$



4) $f(x) = -\frac{1}{2} \cdot \left(\frac{1}{e}\right)^{x+2} - 2$

**Solve each equation.**

5) $4^{3b-2} = 4^{2-2b}$

6) $2^{3x-3} = 8$

7) $4^{3x} = 16$

8) $2^{-2m} = 32$

$$9) \frac{1}{216} \cdot 6^{3m} = 6^{3m}$$

$$10) 49 \cdot 7^{2-2n} = \frac{1}{49}$$

$$11) 36^{3b+3} = 216^{2b+2}$$

$$12) 81 \cdot 3^{2x} = 27$$

$$13) \left(\frac{1}{216}\right)^{-a} \cdot \frac{1}{36} = \frac{1}{36}$$

$$14) 8^{-b} \cdot 64^{3b} = 64$$

$$15) 36 \cdot 36^b = 216^{2-b}$$

$$16) \frac{64^{-2n}}{8^{2n}} = 8$$

Rewrite each equation in exponential form.

$$17) \log_{64} \frac{1}{8} = -\frac{1}{2}$$

$$18) \log_{15} \frac{1}{225} = -2$$

$$19) \log_{64} 16 = \frac{2}{3}$$

$$20) \log_4 16 = 2$$

Rewrite each equation in logarithmic form.

$$21) u^v = \frac{43}{28}$$

$$22) m^n = p$$

$$23) 64^{\frac{1}{2}} = 8$$

$$24) 25^{-\frac{1}{2}} = \frac{1}{5}$$

Evaluate each expression.

$$25) \log_6 216$$

$$26) \log_5 25$$

$$27) \log_5 125$$

$$28) \log_7 343$$

Expand each logarithm.

$$29) \log a^4$$

$$30) \log \sqrt{x}$$

$$31) \log \frac{a}{b}$$

$$32) \log a^2$$

$$33) \log_7 (xy^6)^6$$

$$34) \log_5 (w^3 \sqrt[3]{u})$$

$$35) \log_3 \left(\frac{a^5}{b}\right)^6$$

$$36) \log_2 \frac{x^2}{y^2}$$

Condense each expression to a single logarithm.

$$37) \log_4 z + \log_4 w + \frac{\log_4 x}{3} + \frac{\log_4 y}{3}$$

$$38) 5 \log x + 15 \log y + 5 \log z$$

$$39) 4 \log_4 w + 4 \log_4 u - 2 \log_4 v$$

$$40) 4 \log_5 11 - \log_5 7 - 5 \log_5 3$$

Solve each equation. Round your answers to the nearest ten-thousandth.

$$41) e^a = 30$$

$$42) 18^x = 95$$

$$43) 16^m = 21$$

$$44) 8^x = 41$$

$$45) 6 \cdot 2^{-4v} = 54$$

$$46) -5 \cdot 2^{2m} = -92$$

$$47) 2 \cdot 7^{-m} = 27$$

$$48) 3 \cdot 16^{-6r} = 32$$

$$49) 5e^{3.3n-8} + 2 = 21$$

$$50) -7e^{9k-9} - 4 = -20$$

$$51) -8e^{9x-4} - 10 = -30$$

$$52) 5e^{1.7n+3} - 3.8 = 91$$

Solve each equation.

$$53) \log(2n+9) = \log(4n+7)$$

$$54) \log(-2p-9) = \log(-p+4)$$

$$55) \log(2x+9) = \log(-x-3)$$

$$56) \log(3n-7) = \log(2n+3)$$

$$57) 10 \log_6(r-10) = 20$$

$$58) -5 \log_{12} -4n = -5$$

$$59) -4 \log_2(m+4) = -12$$

$$60) 5 \log_3 -5x = 0$$

$$61) \log(x^2+20) = \log(-9x+2)$$

$$62) \log_{16}(4+3n) = \log_{16} n^2$$

$$63) \log_{11}(x^2-5x) = \log_{11}(10-2x)$$

$$64) \log_7(x^2+10) = \log_7(10x+1)$$

Solve each equation. Round your answers to the nearest ten-thousandth.

$$65) \log 9 + \log x = \log 62$$

$$66) \log x + \log 4 = 2$$

$$67) \log x - \log 2 = 1$$

$$68) \log 9 + \log x = 2$$

Solve each equation.

$$69) \log_8(x+2) + \log_8 x = 1$$

$$70) \log_6 3 + \log_6(x^2-7) = 1$$

$$71) \log_2 9 + \log_2 4x^2 = 2$$

$$72) \log_6 4 - \log_6 2x = 2$$

$$73) \ln(9 - 2x) + \ln 7 = 3$$

$$74) \ln(2x^2 + 8) + \ln 7 = \ln 70$$

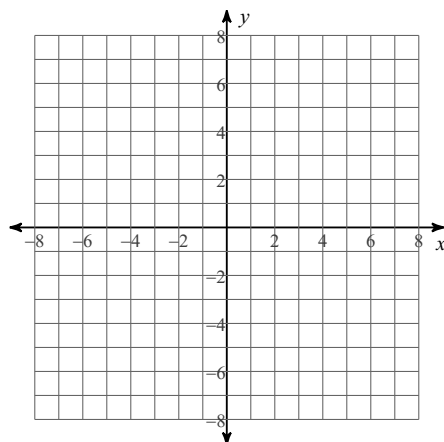
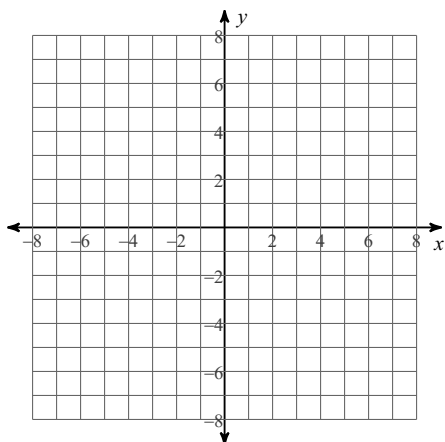
$$75) \ln(2x^2 - 7) + \ln 6 = \ln 66$$

$$76) \ln(-3x - 7) + \ln 4 = 4$$

Identify the domain and range of each. Then sketch the graph.

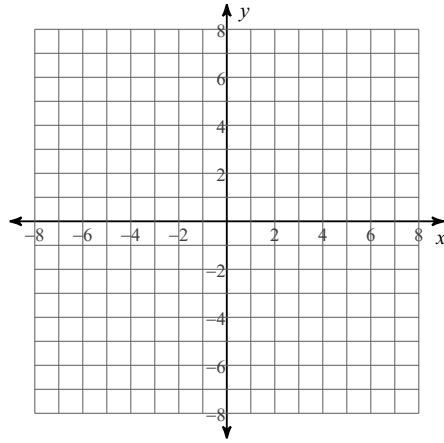
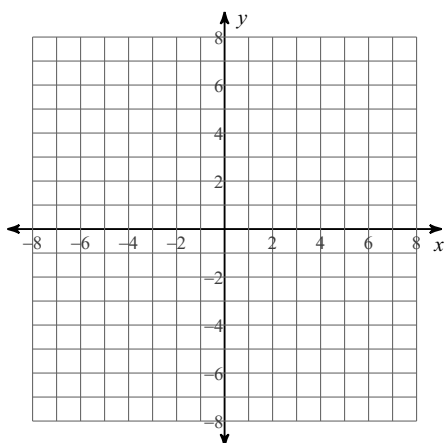
$$77) y = \log_3(x - 1) - 5$$

$$78) y = \log_2(x - 1) - 5$$



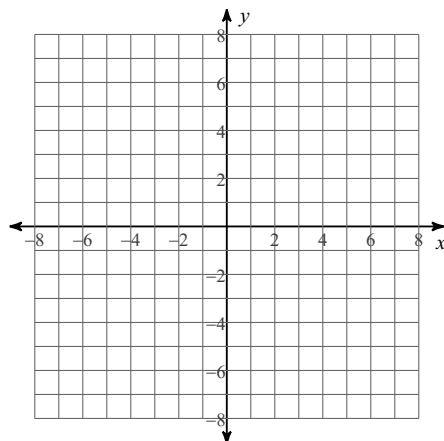
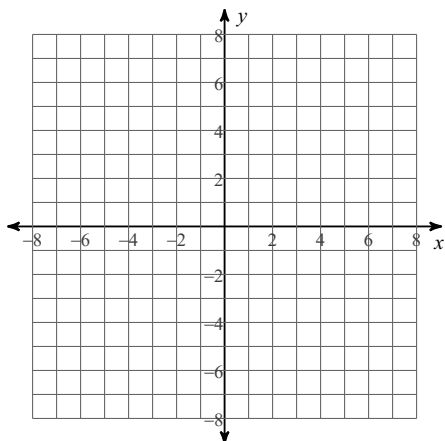
$$79) y = \log_3(x - 1) + 4$$

$$80) y = \log(x - 3) + 3$$

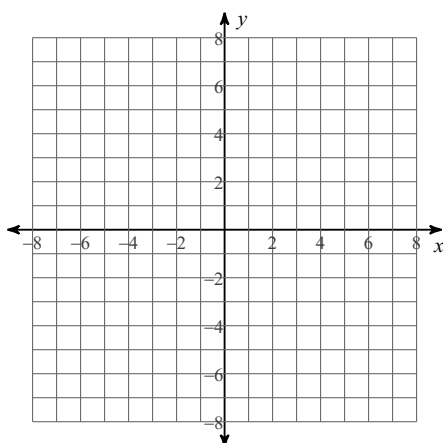


$$81) y = \log_2(2x + 9) - 1$$

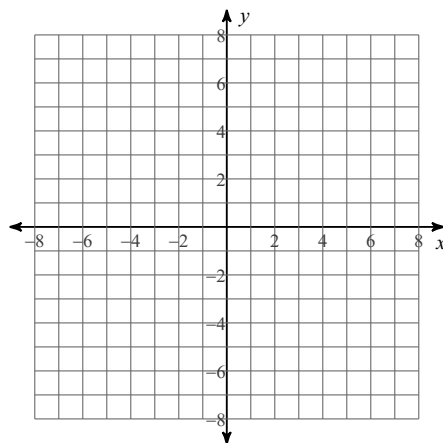
$$82) y = \log_4(2x + 7) - 3$$



83) $y = \log_6(4x + 9) + 2$



84) $y = \log_5(4x + 24) + 1$



85) Heather invests \$2,684 in a retirement account with a fixed annual interest rate of 9% compounded 2 times per year. What will the account balance be after 14 years?

86) Bill invests \$1,132 in a retirement account with a fixed annual interest rate of 2% compounded 2 times per year. What will the account balance be after 20 years?

87) Natalie invests \$6,546 in a savings account with a fixed annual interest rate of 9% compounded 12 times per year. What will the account balance be after 5 years?

88) Darryl invests \$6,812 in a retirement account with a fixed annual interest rate of 4% compounded 2 times per year. What will the account balance be after 19 years?

89) Nicole invests \$4,901 in a savings account with a fixed annual interest rate of 8% compounded continuously. What will the account balance be after 9 years?

90) Alberto invests \$8,329 in a retirement account with a fixed annual interest rate of 3% compounded continuously. What will the account balance be after 14 years?

91) Kali invests \$7,315 in a savings account with a fixed annual interest rate of 6% compounded continuously. What will the account balance be after 10 years?

92) Elisa invests \$5,824 in a savings account with a fixed annual interest rate of 4% compounded continuously. What will the account balance be after 4 years?

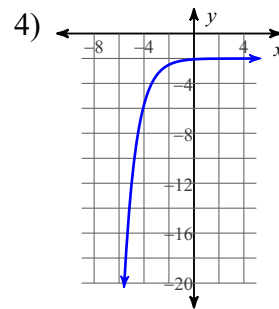
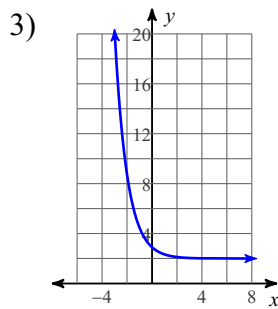
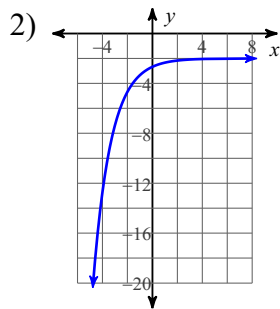
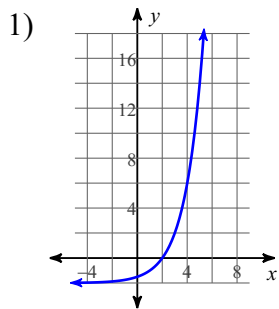
93) Asanji invests \$5,585 in a savings account with a fixed annual interest rate of 8% compounded continuously. How long will it take for the account balance to reach \$11,474.01?

94) Willie invests \$6,426 in a savings account with a fixed annual interest rate of 4% compounded continuously. How long will it take for the account balance to reach \$9,210.57?

95) Kayla invests \$2,271 in a retirement account with a fixed annual interest rate of 9% compounded continuously. How long will it take for the account balance to reach \$11,475.57?

96) Lea invests \$1,067 in a retirement account with a fixed annual interest rate of 8% compounded continuously. How long will it take for the account balance to reach \$3,837.61?

Answers to Ch 3 Extra Practice (ID: 1)



5) $\left\{\frac{4}{5}\right\}$

9) No solution.

12) $\left\{-\frac{1}{2}\right\}$

16) $\left\{-\frac{1}{6}\right\}$

20) $4^2 = 16$

24) $\log_{25} \frac{1}{5} = -\frac{1}{2}$

28) 3

32) $2\log a$

35) $30\log_3 a - 6\log_3 b$

38) $\log(z^5 y^{15} x^5)$

42) 1.5755

46) 2.1008

50) 1.0919

54) $\{-13\}$

58) $\{-3\}$

62) $\{-1, 4\}$

66) $\{25\}$

70) $\{3, -3\}$

74) $\{1, -1\}$

6) $\{2\}$

10) $\{3\}$

13) $\{0\}$

17) $64^{-\frac{1}{2}} = \frac{1}{8}$

21) $\log_u \frac{43}{28} = v$

25) 3

29) $4\log a$

33) $6\log_7 x + 36\log_7 y$

36) $2\log_2 x - 2\log_2 y$

39) $\log_4 \frac{w^4 u^4}{v^2}$

43) 1.0981

47) -1.3375

51) 0.5463

55) $\{-4\}$

59) $\{4\}$

63) $\{-2\}$

67) $\{20\}$

71) $\left\{\frac{1}{3}, -\frac{1}{3}\right\}$

75) $\{3, -3\}$

3)

7) $\left\{\frac{2}{3}\right\}$

11) { All real numbers. }

14) $\left\{\frac{2}{5}\right\}$

18) $15^{-2} = \frac{1}{225}$

22) $\log_m p = n$

26) 2

30) $\frac{\log x}{2}$

34) $3\log_5 w + \frac{\log_5 u}{3}$

37) $\log_4 (wz\sqrt[3]{yx})$

40) $\log_5 \frac{11^4}{7 \cdot 3^5}$

44) 1.7859

48) -0.1423

52) -0.0339

56) $\{10\}$

60) $\left\{-\frac{1}{5}\right\}$

64) $\{1, 9\}$

68) $\{11.1111\}$

72) $\left\{\frac{1}{18}\right\}$

76) $\left\{\frac{-e^4 - 28}{12}\right\}$

4)

8) $\left\{-\frac{5}{2}\right\}$

15) $\left\{\frac{4}{5}\right\}$

19) $64^{\frac{2}{3}} = 16$

23) $\log_{64} 8 = \frac{1}{2}$

27) 3

31) $\log a - \log b$

41) 3.4012

45) -0.7925

49) 2.8288

53) $\{1\}$

57) $\{46\}$

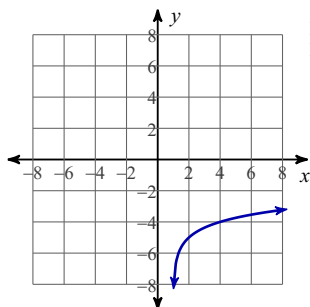
61) $\{-3, -6\}$

65) $\{6.8889\}$

69) $\{2\}$

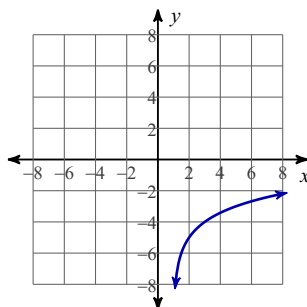
73) $\left\{\frac{-e^3 + 63}{14}\right\}$

77)



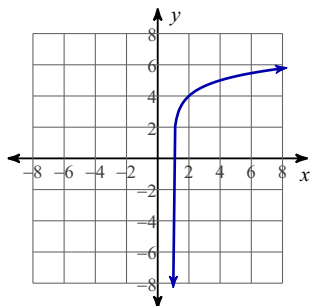
Domain: $x > 1$
Range: All reals

78)



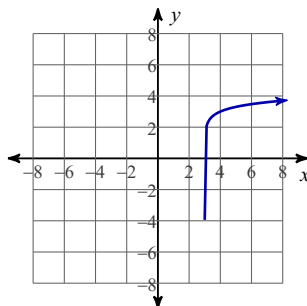
Domain: $x > 1$
Range: All reals

79)



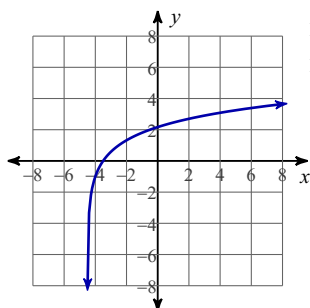
Domain: $x > 1$
Range: All reals

80)



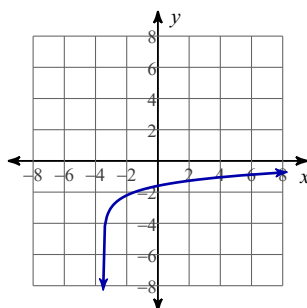
Domain: $x > 3$
Range: All reals

81)



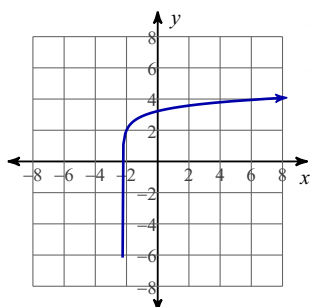
Domain: $x > -\frac{9}{2}$
Range: All reals

82)



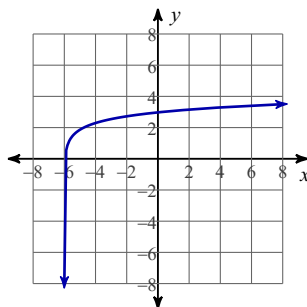
Domain: $x > -\frac{7}{2}$
Range: All reals

83)



Domain: $x > -\frac{9}{4}$
Range: All reals

84)



Domain: $x > -6$
Range: All reals

85) \$9,205.31

86) \$1,685.39

87) \$10,248.95

88) \$14,457.10

89) \$10,068.78

90) \$12,676.42

91) \$13,328.80

92) \$6,834.53

93) 9 years

94) 9 years

95) 18 years

96) 16 years